QUALITY CONTROL REPORTS FOR

GRANUALAR SUB BASE (GSB)

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.12/KRIDL/GSB-1/GR/2014-15 Date : 05.07.2014

GRADATION FOR GSB-I (CLOSE GRADED)
IS: 2720 (Part 4)

Client : **Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of work : Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.

Reference : BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014

Date of Testing : 05.07.2014

Sample Source : GSB Mix Plant Bangalore. **Oven Dry Wt (gm) :** 26100

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Specified Limits
75.0	0	0	0.00	0	100
53.0	1300	1300	4.98	95.02	80-100
26.50	6500	7800	29.89	70.11	55-90
9.50	4000	11800	45.21	54.79	35-65
4.75	3600	15400	59.00	41.00	25-55
2.36	2515	17915	68.64	31.36	20-40
0.425	4525	22440	85.98	14.02	10-25
0.075	2560	25000	95.79	4.21	3-10
PAN	1100				
Total	26100				

Remarks: Satisfies MORTH Specifications as per Table 400-1, Grading I

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CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

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Job No.: CTCE/BBMP/W.No.12/KRIDL/GSB-1/AL/2014-15 Date : 05.07.2014

ATTERBERG LIMITS TEST FOR GSB (CLOSE GRADED)
IS : 2720 (Part - 5)

Client : **Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of work : Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.

Reference : BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014

Date of Testing : 05.07.2014

As per MORTH Table : 400-11

Sl. No.	Particulars	Test Results	Standards as per Specifications
1	Liquid Limit, %	24.00	25.0% Maximum.
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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QUALITY CONTROL REPORTS FOR

WE MIX MACADAM(WMM)

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.12/KRIDL/WMM/Gradation/2014-15

09.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.

Reference : BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014

Date of Testing : 09.07.2014

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **26300**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	915	915	3.5	96.5	95-100
22.4	5250	6165	23.4	76.6	60-80
11.2	5255	11420	43.4	56.6	40-60
4.75	4995	16415	62.4	37.6	25-40
2.36	3815	20230	76.9	23.1	15-30
0.600	2315	22545	85.7	14.3	8-22
0.075	2555	25100	95.4	4.6	0-8

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ಎಸ್.ಎಂ ರಸ್ತೆ, ರಾಜೇಂದ್ರನಗರ, ಬೆಂಗಳೂರು

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Job No.: CTCE/BBMP/W.No.12/KRIDL/WMM/AIV/2014-15 09.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	09.07.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines	21.47	21.67	
	100^{r} (W_2/W_1)%			**21.60**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.12/KRIDL/WMM/S-T/2014-15 09.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of Work	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	09.07.2014

Result : Flakiness Index = **11.25%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **24.50%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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QUALITY CONTROL REPORTS FOR

BITUMINOUS MACADAM

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.12/KRIDL/BM/Bitumen/2014-15 ~~24.07.2014~~ 16/7/14

BITUMEN CONTENT DETERMINATION OF BITUMINOUS MACADAM MIX

AS per IRC:SP:-1984

CLIENT	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/AEE/SSD/DZ./PR/2014-15 Dated: 30.06.2014
SAMPLE I/D	Sapthagiri College Road Ward No.12.
DATE OF TESTING	24.07.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	484	481
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	16	19.00
7. Bitumen content in %	3.20	3.80
8. Average	**3.50**	

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ಶೆಟ್ಟಿಹಳ್ಳಿ ಉಪವಿಭಾಗ, ದಾಸರಹಳ್ಳಿ ವಲಯ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
ಮಂ ಪಾ ಸ್ಟ್ರ, ಗಂಗಾಧರನಗರ, ಬೆಂಗಳೂರು.

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CIVIL-TECH CONSULTANTS AND ENGINEERS

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BM/Bitumen/2014-15 24.07.2014

GRADATION DETERMINATION OF BITUMINOUS MACADAM MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
SAMPLE I/D	Sapthagiri College Road Ward No.12.
DATE OF TESTING	24.07.2014

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-04 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
26.5	0	0	0	100	100
19	33.26	6.87	6.87	93.13	90-100
13.2	82.35	17.01	23.89	76.11	56-88
4.75	260.5	53.82	77.71	22.29	16-36
2.36	45.32	9.36	87.07	12.93	4-19
0.3	18.56	3.83	90.91	9.09	2-10
0.075	7.26	1.50	92.41	7.59	0-8

Þ The results indicated above are based on the tests carried	Trail 2				Specified Limits as per MORTH specification table 500-04 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
26.5	0	0	0	100	100
19	34.26	7.12	7.12	92.88	90-100
13.2	81.25	16.89	24.01	75.99	56-88
4.75	262.5	54.57	78.59	21.41	16-36
2.36	45.25	9.41	88.00	12.00	4-19
0.3	19.26	4.00	92.00	8.00	2-10
0.075	7.58	1.58	93.58	6.42	0-8

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QUALITY CONTROL REPORTS FOR

BITUMINOUS CONCRETE

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.12/KRIDL/QB(BC)/2014-15 22.07.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
AGENCY	:	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	:	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
REFERENCE	:	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
SOURCE OF LOCATION	:	Hot mix Plant, Bangalore
DATE OF TESTING	:	22.07.2014

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 °C, 1/10 mm	IS :1203 -1978 (RA-2009)	64	60 to 70
2	Softening point, °C	IS :1205 -1978 (RA-2009)	44	Min. 45
3	Ductility at 27°C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 50
4	Flash Point, °C	IS :1209 -1978 (RA-2009)	292	Min. 220

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/AIV/2014-15 23.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	23.07.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	380	381	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	81	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines			
	100* (W_2/W_1) percent	21.05	21.26	**21.16**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/AIV/2014-15 23.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	23.07.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	383	384	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	83	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines			
	100^* (W_2/W_1) percent	21.67	21.88	**21.77**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/AIV/2014-15 23.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	23.07.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	388	390	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	89	90	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	300	
4	Aggregate Impact value = percent fines			
	100* (W_2/W_1) percent	22.94	23.08	**23.01**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

Note:

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Building & Highway Material Testing Laboratory

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/AIV/2014-15 23.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	23.07.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	79	80	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines			
	100* (W_2/W_1) percent	20.84	21.05	**20.95**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Shape.T/2014-15 : 23.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	: BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 23.07.2014

Result : Flakiness Index = **11.22%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **24.47%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Dense Graded Bituminous Macadam is 30%

Note:

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	: BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 23.07.2014

Result : Flakiness Index = **11.85%**

Elongation Index = **13.12%**

Result : Combined Flakiness & Elongation index **24.97%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Dense Graded Bituminous Macadam is 30%

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	: BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 23.07.2014

Result : Flakiness Index = **11.98%**

Elongation Index = **12.35%**

Result : Combined Flakiness & Elongation index **24.33%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Dense Graded Bituminous Macadam is 30%

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	: BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 23.07.2014

Result : Flakiness Index = **12.32%**

Elongation Index = **13.68%**

Result : Combined Flakiness & Elongation index **26.00%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Dense Graded Bituminous Macadam is 30%

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Stripping/2014-15 26.07.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Type of Mix	Bituminous Concrete
Date of Testing	26.07.2014

Type of binder : 60/70
Percentage of binder used : 5.00% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.00 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.3		
2	3.4	3.40	96.60
3	3.5		

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

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ದಾಸರಹಳ್ಳಿ ಉಪವಿಭಾಗ, ದಾಸರಹಳ್ಳಿ ವಲಯ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
ಎಸ್.ಎಂ ರಸ್ತೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು.

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Sp_Wa/2014-15 26.07.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Type of Mix	Bituminous Concrete
Date of Testing	26.07.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	1995	1996	1997	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_3$ g	1239	1238	1242	
4	Weight of saturated surface dry aggregate in air	W_3 g	2018	2019	2020	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	779	781	778	
6	Weight of oven dried aggregate	W_4 g	2003	2004	2005	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.571	2.566	2.577	2.571
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.622	2.616	2.628	2.622
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.75%	0.75%	0.75%	0.75%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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JobNo: CTCE/BBMP/W.No.12/KRIDL/BC/Bitumen/2014-15 26.07.2014

BITUMEN CONTENT DETERMINATION OF BITUMINOUS CONCRETE MIX

As per IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layour Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
SAMPLE I/D	Sapthagiri College Main Road ward No.12.
DATE OF TESTING	26.07.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	473.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26	26.50
7. Bitumen content in %	5.20	5.30
8. Average	**5.25**	

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JobNo: CTCE/BBMP/W.No.12/KRIDL/BC/Bitumen/2014-15 26.07.2014

BITUMEN CONTENT AFTER GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

As Per IS 2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP,
REFERENCE	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
SAMPLE I/D	Sapthagiri College Main Road ward No.12.
DATE OF TESTING	26.07.2014

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	46.25	9.76	9.76	90.24	79-100
9.5	35.26	7.44	17.20	82.80	70-88
4.75	71.25	15.03	32.23	67.77	53-71
2.36	66.32	13.99	46.22	53.78	42-58
1.18	50.22	10.59	56.81	43.19	34-48
0.6	62.32	13.15	69.96	30.04	26-38
0.3	49.35	10.41	80.37	19.63	18-28
0.15	30.25	6.38	86.76	13.24	12-20
0.075	32.25	6.80	93.56	6.44	4-10

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	32.56	6.88	6.88	93.12	79-100
9.5	46.25	9.77	16.64	83.36	70-88
4.75	75.25	15.89	32.54	67.46	53-71
2.36	63.25	13.36	45.89	54.11	42-58
1.18	75.21	15.88	61.78	38.22	34-48
0.6	42.25	8.92	70.70	29.30	26-38
0.3	36.25	7.66	78.36	21.64	18-28
0.15	40.25	8.50	86.86	13.14	12-20
0.075	32.5	6.87	93.72	6.28	4-10

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Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** Shettyhalli Sub Division, Dasarahalli Zone, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of theWork	Improvements to road from Hesaraghatta Main Road to Vigneshwara Layout Chikkasandra, in Ward No.12, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/SSD/DZ/PR/2014-15 Dated: 30.06.2014
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	26.07.2014

Total Weight of Sample: **5250** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	600	11.43	11.43	88.57	79 - 100	
9.5	490	9.33	20.76	79.24	70 - 88	
4.75	645	12.29	33.05	66.95	53 - 71	
2.36	525	10.00	43.05	56.95	42 - 58	
1.18	640	12.19	55.24	44.76	34 - 48	
0.600	515	9.81	65.05	34.95	26 - 38	
0.300	555	10.57	75.62	24.38	18 - 28	
0.150	445	8.48	84.10	15.90	12 - 20	
0.075	525	10.00	94.10	5.90	4 - 10	

Total Weight of Sample: **5350** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	625	11.68	11.68	88.32	79 - 100	
9.5	480	8.97	20.65	79.35	70 - 88	
4.75	645	12.06	32.71	67.29	53 - 71	
2.36	520	9.72	42.43	57.57	42 - 58	
1.18	635	11.87	54.30	45.70	34 - 48	
0.600	580	10.84	65.14	34.86	26 - 38	
0.300	485	9.07	74.21	25.79	18 - 28	
0.150	435	8.13	82.34	17.66	12 - 20	
0.075	450	8.41	90.75	9.25	4 - 10	

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